

## REMARKS

The Examiner's Office Action of August 29, 2003 has been received and its contents reviewed. Applicants would like to thank the Examiner for the consideration given to the above-identified application.

By the above actions, claim 1 has been amended, claims 2, 6-9, and 11-12 have been cancelled, claims 3-5 have previously been withdrawn, and new claims 13-15 have been added. Accordingly, claims 1, 10, and 13-15 are pending for consideration, of which claims 1 is independent. In view of these actions and the following remarks, reconsideration of this application is now requested.

Referring now to the detailed Office Action, claims 11 and 12 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner contends that the language "the ferroelectric film is like  $\text{SrBi}_2\text{O}_9$ " is unclear, and whether the ferroelectric film is made of  $\text{SrBi}_2\text{O}_9$  or the compound of  $\text{SrBi}_2\text{Ta}_2\text{O}_9$ . As claims 11 and 12 have been cancelled, as shown above, their rejection is rendered as moot.

Claims 1 and 10-12 stand rejected under 35 U.S.C. §103(a) as unpatentable over Kanaya et al. (U.S. Patent No. 6,586,790 – hereafter Kanaya). This rejection is respectfully traversed at least for the reasons provided below.

The present invention relates to providing a contact layer between an upper electrode and an insulating film, and on the upper electrode, so as to improve adhesion between the upper electrode and the insulating film covering a capacitor. The contact layer of the present invention is composed of either a single-layer film being made of a metal oxide or a metal nitride, or a multilayer structure being made of metal oxide and metal nitride films, so that atoms in the contact layer are prevented from diffusing into a ferroelectric film. As a result, the degradation in the polarization properties of the ferroelectric film can be suppressed.

With respect to the Kanaya reference, Kanaya discloses that, in order to prevent the degradation in characteristics of a capacitive insulating film caused by penetration of hydrogen and in order to suppress the damage of the capacitive insulating film during the formation of a protecting film in a subsequent process step, a hydrogen barrier film 402 made of a metal oxide film, which allegedly corresponds to the contact layer of the present invention, is formed on insulating film 306a entirely covering a capacitor.

In contrast with Kanaya, in the present invention of amended claim 1, the contact layer is formed directly on the upper electrode, and is in contact therewith. Thus, the present invention, as recited in amended claim 1, is at least structurally different from Kanaya.

Since the insulating film, e.g., 306a, of Kanaya is formed over the upper electrode and the ferroelectric film to prevent reaction caused by directly contacting the hydrogen barrier film with the ferroelectric film, Kanaya cannot provide the hydrogen barrier film 402 (i.e., the contact layer) directly on the capacitor (see col. 18, lines 28-31 of Kanaya). If the hydrogen barrier film were formed on the upper electrode so as not to be in contact with the ferroelectric film in Kanaya, the object of forming the hydrogen barrier film to prevent the penetration of hydrogen into the ferroelectric film would not be achieved. Thus, Kanaya does not render the feature of the present invention obvious, as Kanaya does not teach, disclose, or suggest forming the hydrogen barrier film 402 (i.e., the contact layer) on the upper electrode to avoid being in contact with the ferroelectric film.

Moreover, if the contact layer were in contact with the ferroelectric film in the present invention, the atoms in the contact layer would directly and easily diffuse into the ferroelectric film by heat treatment, and hence the problem of the present invention would not be solved. Hence, in the present invention, it is essential that the contact layer is formed on the upper electrode so as not to be in contact with the ferroelectric film.

Furthermore, Kanaya fails to disclose or suggest the problem of bad contact between the upper electrode and the insulating film formed thereon. Hence, Kanaya does not provide a solution for such a problem.

The requirements for establishing a *prima facie* case of obviousness, as detailed in MPEP § 2143 - 2143.03 (pages 2100-122 - 2100-136), are: first, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to combine the teachings; second, there must be a reasonable expectation of success; and, finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. As Kanaya is deficient in disclosing, teaching, or suggesting a contact layer formed directly on an upper electrode, and the effect obtained thereby, the rejection under 35 USC §103(a) is improper.

Claims 13-15 have been added to further complete the scope to which Applicants are entitled. Supports for the amendment to claim 1 can be found on page 12, line 6 and Fig. 1A,

for example. Support for new dependent claim 13 can be found on, e.g., page 12, line 5. Support for new dependent claim 14 can be found on, e.g., page 7, lines 16-17. Support for new dependent claim 15 can be found at least on, e.g., page 7, lines 17-19.

In view of the amendments and arguments set forth above, Applicants respectfully requests reconsideration and withdrawal of all the pending rejections.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicant's representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,

  
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